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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/648,455 | 08/28/2000 | Tomio Iwasaki | 500.38949X00 | 5434 |

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ANTONELLI TERRY STOUT AND KRAUS
SUITE 1800
1300 NORTH SEVENTEENTH STREET
ARLINGTON, VA 22209

[REDACTED] EXAMINER

OWENS, DOUGLAS W

[REDACTED] ART UNIT [REDACTED] PAPER NUMBER

2811

DATE MAILED: 02/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

| | |
|-----------------|----------------|
| Application No. | IWASAKI ET AL. |
| Examiner | Art Unit |
| Douglas W Owens | 2811 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 02 December 2002.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-4, 10 and 12-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) 10, 12 is/are allowed.
- 6) Claim(s) 1, 2, 4, 13 and 14 is/are rejected.
- 7) Claim(s) 3 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413) Paper No(s). _____.
2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) Notice of Informal Patent Application (PTO-152)
3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. 6) Other: _____

DETAILED ACTION

Suggested Claim Amendments

1. Claims 1, 4, 10, 12 and 13 recite the limitation, "...conductors formed on a side of a main face of the substrate..." It is suggested that this limitation be changed to read "...conductors formed on a portion of a main face of the substrate..." or similar language.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 4 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over US patent No. 6,323,554 to Joshi et al. in view of Japanese patent No. 363230845A to Kusano et al.

Regarding claims 1, 4, 13 and 14, Joshi et al. teaches a semiconductor device with a conductor ((Fig. 7B, for example (16)) on a substrate, further comprising a film (28) adjacent the conductor, wherein the film comprises titanium (Col. 8, line 54 to Col. 9, line 22). Joshi et al. does not teach a conductor comprising aluminum as a main constituent and containing copper and nickel. Kusano et al. teaches a conductor comprising aluminum as a main constituent and containing copper and nickel. It would have been obvious to one of ordinary skill in the art to incorporate conductor taught by

Kusano et al. into the device taught by Joshi et al. since it is a known conductor that is suitable for use in semiconductor devices.

Joshi et al. does not explicitly teach that the conductors are formed in a plurality of layers. Joshi et al. teaches metal filled vias and conductor lines which are normally used in multi-level interconnect structures. It is not considered inventive to manufacture multiple levels of the device taught by Joshi et al., since this is what is normally done with multi-level interconnect structures. Additionally, it has been held that mere duplication of parts has no patentable significance unless a new and unexpected result is produced (*In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960)).

Neither Joshi et al. nor Kusano et al. explicitly teach means for suppressing diffusion of copper atoms in the aluminum conductors. The nickel in the conductor taught by Kusano et al. would have inherently prevented diffusion of copper since it is identical to the material of the claimed invention.

Regarding claim 2, neither Joshi et al. nor Kusano et al. teach a semiconductor device, wherein the spacing of the conductors is not more than 0.4 microns. It would have been a matter of obviousness for one having ordinary skill to in the art to arrive at the optimal spacing of the conductors through routine experimentation.

Allowable Subject Matter

4. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
5. Claims 10 and 12 are allowed.

Response to Arguments

6. Applicant's arguments with respect to claims 1 - 4 have been considered but are moot in view of the new ground(s) of rejection.

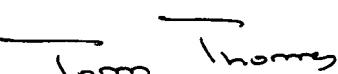
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Douglas W Owens whose telephone number is 703-308-6167. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

DWO
February 22, 2003


TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800